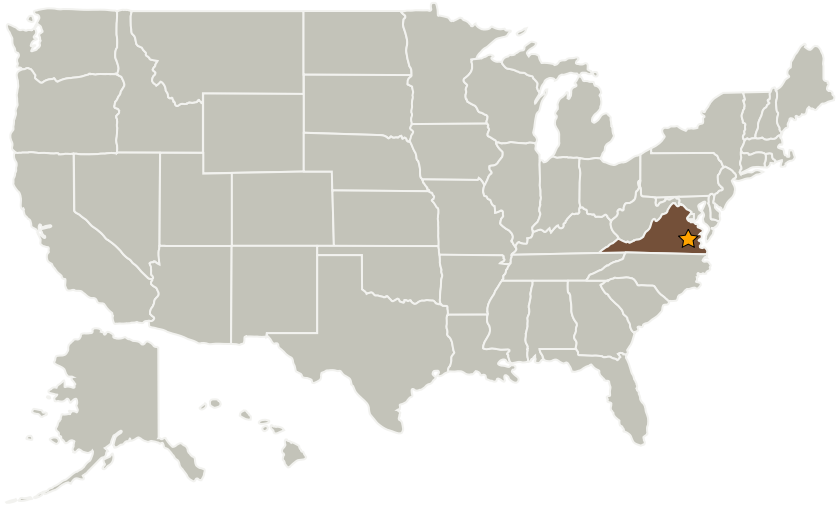
Real Time Monitoring and Test Vector Generation for Improved Flight Safety, Phase I

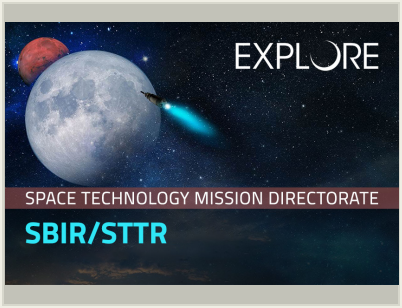
Completed Technology Project (2005 - 2005)

Project Introduction

As the complexity of flight controllers grows so does the cost associated with verification and validation (V&V). Current-generation controllers are reaching a level of complexity that pushes the envelopes of existing V&V approaches, and without improved approaches there is little hope for affordable V&V of next-generation intelligent systems. Unfortunately, controller complexity and controller validation are required to ensure the safety of next-generation systems. Barron Associates proposes an aggressive plan of research to develop monitoring algorithms that estimate, in real time, safety margins of complex systems based on observed differences between the model used for controller development and actual flight data. The Phase I and Phase II research will focus on the flight test environment where these algorithms would allow the flight test engineer to monitor and revise the test plan in real time - skipping ahead in the buildup when safety is assured and avoiding test points where safety is questionable. The tool would also recommend test points that could help refine safety margin estimates for as yet unexecuted maneuvers. The result will be reduced flight test costs and improved safety. Phase I will develop a prototype approach and Phase II would implement the approach in a software tool.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Barron Associates, Inc.	Supporting Organization	Industry	Charlottesville, Virginia

Primary U.S. Work Locations
Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Alec Bateman

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.4 Environmental Monitoring, Safety, and Emergency Response
    - TX06.4.2 Fire: Detection, Suppression, and Recovery